We Claim:

1. An organometallic complex of the formula

$$[(D_o)_n\, ML_x\,]_k$$

where M is selected from the group consisting of Cu, Ag and Au;

D_o is selected from the group consisting of ethers, phosphines, olefins, sulfides, pyridines, carbonyl, hydroxyl, cyclopentadiene, benzene derivatives, allyls, alkyls, amines, polyamines, aniline derivatives, cyclooctadiene and combinations thereof;

n is an integer having a value from 0 to 4;

k is an integer having a value from 1 to 4;

x is an integer having a value from 1 to 4; and

L is an amidinate ligand of the formula

$$R^1\text{-}N \underline{\text{---}} C(R^2) \underline{\text{---}} N\text{-}R^3$$

where R^1, R^2 and R^3 are selected from the group consisting of alkyls, allyls, aryls, heteroaryls, hydrogen, non-metals and metalloids; and where R^1, R^2 and R^3 are different or the same.

2. The organometallic complex of claim 1 wherein R^1 and R^3 are the same and are selected from the group consisting of ^{t}Bu and ^{i}Pr.

3. An organometallic complex of the formula

$$H_nML_x$$

where M is selected from the group consisting of Cu, Ag and Au;

where n and x are integers and $n + x \leq 7$;

where L is an amidinate ligand of the formula

$$R^1\text{-}N \underline{\text{---}} C(R^2) \underline{\text{---}} N\text{-}R^3$$

where R^1, R^2 and R^3 are selected from the group consisting of alkyls, allyls, aryls, heteroaryls, hydrogen, non-metals and metalloids; and where R^1, R^2 and R^3 are different or the same.

4. The organometallic complex of claim 3 wherein R^1 and R^3 are the same and are selected from the group consisting of ^{t}Bu and ^{i}Pr.

5. The use of an organometallic complex according to claim 4 for the deposition of the metal M of claim 3 by the use of heat, light, ultrasound, radiation, high energy particles, reactive gases or combinations thereof.

6. The use of an organometallic complex according to claim 1 for the deposition of the metal M of claim 1 by the use of heat, light, ultrasound, radiation, high energy particles, reactive gases or combinations thereof.

7. The use of an organometallic complex according to claim 3 for the deposition of the metal M of claim 3 by the use of heat, light, ultrasound, radiation, high energy particles, reactive gases or combinations thereof.

8. The use of an organometallic complex according to claims 6 or 7 wherein the deposition process is chemical vapor deposition or chemical vapor deposition coupled with a physical deposition technique.

9. A method for depositing a metal including the steps of:

   i) heating a substrate onto which deposition of said metal is to occur, said substrate being located in a deposition chamber;

   ii) producing a vapor of a precursor of the formula

$$[(D_o)_n ML_x]_k$$

   where M is selected from the group consisting of Cu, Ag and Au;

   D_o is selected from the group consisting of ethers, phosphines, olefins, sulfides, pyridines, carbonyl, hydroxyl, cyclopentadiene, benzene derivatives, allyls, alkyls, amines, polyamines, aniline derivatives, cyclooctadiene and combinations thereof;

   n is an integer having a value from 0 to 4;

   k is an integer having a value from 1 to 4;

x is an integer having a value from 1 to 4; and

L is an amidinate ligand of the formula

R^1-N --- C(R^2) --- N-R^3

where R^1, R^2 and R^3 are selected from the group consisting of alkyls, allyls, aryls, heteroaryls, hydrogen, non-metals and metalloids; and where R^1, R^2 and R^3 are different or the same,

in the chamber in the vicinity of the substrate; and

iii) decomposing the vapor to deposit the metal on the substrate.

10. A method for depositing a metal including the steps of:

i) heating a substrate onto which deposition of said metal is to occur, said substrate being located in a deposition chamber;

ii) producing a vapor of a precursor of the formula

H_nML_x

where M is selected from the group consisting of Cu, Ag and Au;

where n and x are integers and $n + x \leq 7$;

where L is an amidinate ligand of the formula

R^1-N --- C(R^2) --- N-R^3

where R^1, R^2 and R^3 are selected from the group consisting of alkyls, allyls, aryls, heteroaryls, hydrogen, non-metals and metalloids; and where R^1, R^2 and R^3 are different or the same, in the chamber in the vicinity of the substrate; and

iii) decomposing the vapor to deposit the metal on the substrate.

11. The use of an organometallic complex according to claims 1 or 3 with oxygen or a chemical source of oxygen for the deposition of metal oxides of the metal M of claim 1, by the use of heat, light, ultrasound, radiation, high energy particles, reactive gases or combinations thereof.

12. The use of an organometallic complex according to claims 1 or 3 with sulfur or a chemical source of sulfur for the deposition of metal sulfides of the metal M of claim

1, by the use of heat, light, ultrasound, radiation, high energy particles, reactive gases or combinations thereof.

13. The use of an organometallic complex according to claims 1 or 3 with boron or a chemical source of boron for the deposition of metal borides of the metal M of claim 1, by the use of heat, light, ultrasound, radiation, high energy particles, reactive gases or combinations thereof.

14. The use of an organometallic complex according to claims 1 or 3 with silicon or a chemical source of silicon for the deposition of metal silicides of the metal M of claim 1, by the use of heat, light, ultrasound, radiation, high energy particles, reactive gases or combinations thereof.

15. The use of an organometallic complex according to claims 1 or 3 with ammonia or a chemical source of nitrogen for the deposition of metal nitrides of the metal M of claim 1, by the use of heat, light, ultrasound, radiation, high energy particles, reactive gases or combinations thereof.

16. The use of an organometallic complex according to claims 1 or 3 with a chemical source of carbon for the deposition of metal carbides of the metal M of claim 1, by the use of heat, light, ultrasound, radiation, high energy particles, reactive gases or combinations thereof.

17. The use of an organometallic complex according to claims 1 or 3 with phosphine or a chemical source of phosphorous for the deposition of metal phosphides of the metal M of claim 1, by the use of heat, light, ultrasound, radiation, high energy particles, reactive gases or combinations thereof.

18. The use of an organometallic complex according to claims 1 or 3 with arsine or a chemical source of arsenic for the deposition of metal arsenides of the metal M of claim 1, by the use of heat, light, ultrasound, radiation, high energy particles, reactive gases or combinations thereof.

19. The use of an organometallic complex according to claims 1 or 3 with hydrogen selenide or a chemical source of selenium for the deposition of metal selenides of the metal M of claim 1, by the use of heat, light, ultrasound, radiation, high energy particles, reactive gases or combinations thereof.

20. The use of an organometallic complex according to claims 1 or 3 with hydrogen telluride or a chemical source of tellurium for the deposition of metal tellurides of the metal M of claim 1, by the use of heat, light, ultrasound, radiation, high energy particles, reactive gases or combinations thereof.

21. The use of a combination of two or more metal complexes according to claim 1 or 3 to produce alloys of the metals M of the metal complexes.